Tools for Focusing Contaminated Sediment Site Management Strategy Development

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Sediment Management Workgroup

Sediment Management Work Group
BACKGROUND

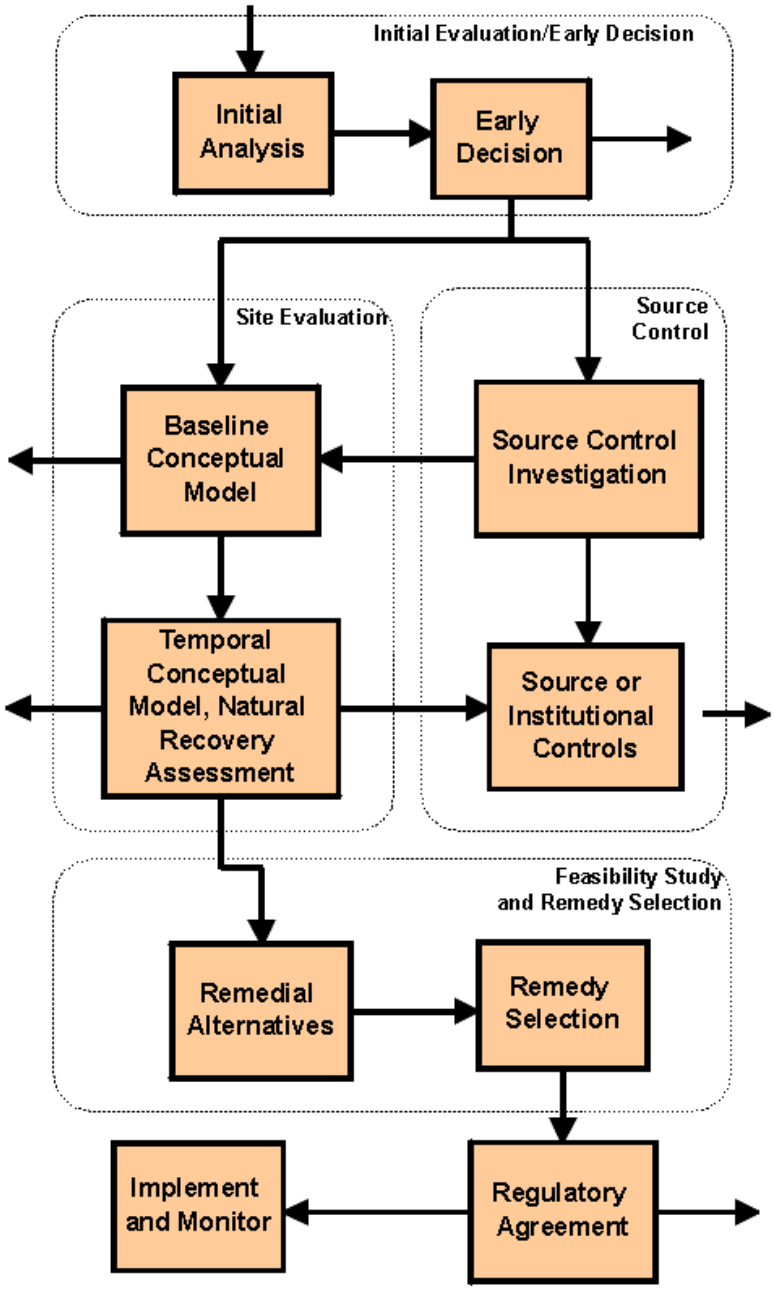
- SMWG Formation - May 1998, Currently > 40 Members
- Coordinated Approach by Entities Responsible for Developing/Implementing Contaminated Sediment Management Strategies
- OUR MISSION ... To advance risk-based, scientifically sound approaches for evaluation of sediment management decisions
- OUR OBJECTIVES ... To collect, develop, analyze and share data and information on the effectiveness of sediment management technologies and approaches

Some SMWG INITIATIVES

www.smwg.org

- Co-sponsored Sediment Stability Workshop,
  January 2002 (with U.S. EPA, U.S. ACE/WES, LSU-HSRC, and U.S. Navy)
- Provided technical input to the National Academy of Science Special Committee in Development of a Risk-Based Framework and Evaluation of Remediation Options for PCB-Contaminated Sediments
- Publication of nine technical papers
- *Decision Tree For Sediment Management*
- Eight Key Questions for Evaluation

Sediment Management Decision Framework



CONCEPTUAL SITE MODEL

- A Conceptual Site Model (CSM) is a representation of the environmental system and the physical, chemical and biological processes that determine the transport of contaminants from sources through complete pathways to receptors
  - A valid CSM is critical to the evaluation of any sediment site and is the major tool for problem formulation
  - The CSM is developed with consideration of potential remedial strategies
  - The CSM should incorporate risk management principles

Conceptual Site Model

- As A Working Tool
  - Used to test hypotheses through site characterization to define complete pathways
  - Used to identify data gaps and resolve conflicting data
  - The CSM is refined as data are collected and evaluated from assessment through remedial action
  - Remediation goals are defined early in the process, but may be revised as CSM is refined
  - Communication tool for stakeholders

Conceptual Site Model

- Level of complexity of the CSM depends on the complexity of the site and the potential risk posed
- More specific conceptual or numeric models contribute to the understanding of site dynamics
  - sediment and contaminant transport
  - food web
  - hydrogeologic
  - geochemical
- More complex sites may require a temporal CSM
  - describes how the system responded to stresses in the past; prediction of system response to changing site conditions - natural or imposed

CONCEPTS INCLUDED in CSM

- Bioavailability
- Bioaccessibility
- Natural Recovery Processes
- Sediment Bed Stability
- Risk Management Principles

KEY QUESTIONS TO CONSIDER WHEN DEVELOPING THE CSM

- Are ongoing, external sources significant and can these be readily controlled?
- Does the presence of contamination present unacceptable risk?
- Are there any readily-implementable solutions that may be initiated prior to final remedy selection that will reduce the risk posed by the sediment contamination in whole or in part?
- Will risks become acceptable via natural recovery and, if so, over what time frame?

KEY QUESTIONS TO CONSIDER WHEN DEVELOPING THE CSM

- Can active remediation significantly accelerate the achievement of acceptable risk?
- Will rare natural events or human activity significantly disrupt conditions?
- What are all of the short term and long term risks for each option (including implementation and post-remedial risks)?
- What are the comparative risk reductions of the sediment management options under consideration?

Some Improvements To Be Made to SMWG Decision Tree

- Expand and Emphasize discussion of External Source Identification and Control
- Uncertainty Analysis:
  - Decisions with imperfect knowledge
  - Weight of Evidence
  - Uncertainty vs. Risk
- Net Risk Reduction of A Remedial Action
  - Incorporates all long and short term risks associated with an option
- Comparative Analysis of Management Strategies
  - Comparative analysis of alternatives and Management Strategies incorporating other societal and economic risks